STATE OF CALIFORNIA

DEPARTMENT OF PUBLIC HEALTH

IN RE: Trabuco Canyon Water District
32003 Dove Canyon Drive
Trabuco Canyon, CA 92679

TO: Mr. Don Chadd
General Manager

COMPLIANCE ORDER

COMPLIANCE ORDER NUMBER 05-08-07CO-003

WATER SYSTEM NO. 3010094

Issued on July 23, 2007

BACKGROUND

The Trabuco Canyon Water District (District) is a community water system located in the southeastern portion of Orange County. The District's service area covers several unincorported areas in south Orange County and a portion of the city of Rancho Santa Margarita. The District's water system serves 13,365 people in the communities of Trabuco Canyon, Robinson Ranch, Trabuco Highlands, Walden, Rancho Cielo, Portola Hills, Santiago Canyon, and Dove Canyon through 4,013 service connections. The District is currently operating under the authority of Water Supply Permit No. 04-08-94P-006.

The District obtains water from a variety of sources including local groundwater (Lang Well, Rose Well, and U.S. Well), treated surface water from the District's Dimension Surface Water Treatment Plant, treated surface water supplied by the Metropolitan Water District of Southern California, and connections to the El Toro Water District, Santa Margarita Water District, and Irvine Ranch Water District. The approved treatment facilities include the Dimension Surface Water Treatment Plant and hypochlorination facilities at the well sites. The District has a total of eight reservoirs with a combined storage capacity of 10.5 million gallons and ten pump stations that are located throughout its service area.

Rose Well and Lang Well are located in the Rose Canyon Well Field near the intersection of Trabuco Canyon Road and Rose Canyon Road. Both wells were constructed approximately 120 feet away from the center of a seasonal creek, the Trabuco Creek (also known as Arroyo Trabuco). The wells extract water from the Arroyo Trabuco Aquifer, a shallow alluvial aquifer underlying the Trabuco Creek. The Arroyo Trabuco Aquifer is part of the San Juan Valley Groundwater Basin. The production rate of each well ranges from 80 to 500 gallons per minute (gpm), depending on seasonal rainfall conditions. Average annual precipitation ranges from 11 to 15 inches. In wet years, there is sufficient water to allow the wells to be operated all year. In years of average rainfall conditions, the wells operate about seven months before the water levels drop too low to maintain pumping. In dry years, however, the wells have only been operable for as few as two months.

Lang Well has a 20-inch diameter steel casing extending to the depth of 45 feet below ground surface (bgs). The perforation begins at approximately 24 feet bgs

and ends at 44 feet bgs. Rose Well has a 30-inch diameter steel casing. The casing length and perforation information for Rose Well is not available. Each well is equipped with a vertical turbine pump. Rose Well discharges to an 8-inch transmission main while Lang Well discharges to a 14-inch main. Water produced by the wells is disinfected with sodium hypochlorite to provide approximately 1.8 milligrams per liter (mg/L) chlorine residual. Due to the shallow well depths, shallow perforations, the absence of annular seals, and close proximity to the creek, the influence of the creek water upon the quality of water produced by the wells is a concern.

FINDINGS OF FACT

In February 1996, the California Department of Health Services, the predecessor of this Department of Public Health (Department) issued a letter (Attachment 1) to the District requesting the District to initiate a monitoring program to evaluate the influence of surface water on the Rose Well and Lang Well water quality. From December 23, 1996 through April 10, 1997, the District monitored temperature, turbidity, pH, and total dissolved solids in water samples taken simultaneously from the creek, Rose Well, and Lang Well on a weekly basis. The monitoring results indicated that the aforementioned physical parameters of water in the two wells are strongly correlated to those of the Trabuco Creek.

In 1999, the Department determined that Rose Well and Lang Well are under the direct influence of surface water and are subject to the California Surface Water Treatment Regulations (Attachment 2). An engineering study of the Rose Well and

Lang Well conducted by HDR Engineering, Inc. from March 2003 to August 2005 reaffirmed the Department's determination.

The California Code of Regulations (CCR), Title 22, Chapter 17, Section 64650 through 64666, otherwise known as the California Surface Water Treatment Regulations (SWTR), require that each water supplier using an approved surface water or groundwater under the direct influence of surface water source to provide multibarrier treatment necessary to reliably protect users from the adverse health effects of microbiological contaminants and to comply with the performance standards and other requirements prescribed in Chapter 17. Water suppliers must provide treatment that reliably ensures through filtration and disinfection at least a total of 99.9 percent (3-log) and 99.99 percent (4-log) reduction of *Giardia* cysts and viruses, respectively.

The federal Interim Enhanced Surface Water Treatment Rule (IESWTR, 1998) requires water suppliers to provide treatment that reliably ensures at least 99 percent (2-log) reduction of *Cryptosporidium*. The federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR, 2006) further requires filtered systems to monitor the raw water sources for *Cryptosporidium* and to provide additional *Cryptosporidium* treatment if the monitoring results indicate that the sources have an elevated *Cryptosporidium* contamination risk.

On March 31, 1999, the District submitted to the Department a Safe Drinking Water State Revolving Fund (SDWSRF) application to secure funding for the construction of a water treatment plant to treat groundwater pumped from the Rose Well and Lang Well. The California Department of Water Resource (DWR) issued to the

District a Notice of Application Acceptance (NOAA) in September 1999. The NOAA was later revoked by DWR because the District did not timely fulfill the requirements listed in the NOAA. As a result, the project had been by-passed for funding as described in the DWR's letter dated May 20, 2004 (Attachment 3). In the letter the District was advised of its duty to comply with the Safe Drinking Water Act, even though the project had been by-passed for funding.

In March 2003, the District contracted with CGvL Engineers (which has since become a part of HDR Engineering, Inc.) to study the effectiveness of bank filtration on the Rose Well and Lang Well water quality and the potential project cost saving that could be realized from the bank filtration removal credits. In July 2004, the District resubmitted to the Department a SDWSRF pre-application to obtain funding for the Rose Well and Lang Well water treatment plant construction. However, the District requested a postponement of this project for one year in May 2005, citing reasons of management changes and pending study results from HDR Engineering, Inc. (Attachment 4).

Based on data collected from the creek and the wells in March and April 2003 and between March and August, 2005, HDR Engineering, Inc. estimated that the travel time for the creek water to travel through the approximately 120 feet of aquifer separating the creek and the wells is from 30 to 32 hours. HDR Engineering, Inc. also concluded that good natural filtration is provided for water produced from the Rose Well and Lang Well as evident by the good turbidity and coliform bacteria reduction. While the turbidity in the creek water reached as high as 2,594 NTU, the turbidity in the well water has never exceeded 0.7 NTU during the study periods. Most of the time, the turbidity in the wells was below 0.2 NTU. Total coliform count

of 20 samples collected from the creek during 2003 and 2005 ranged from 29 to 24,000 MPN/100 mL. Fecal coliform count ranged from 4 to 400 MPN/100mL. With one exception, Well samples during the same period show no total coliform and fecal coliform. Total coliform and fecal coliform were detected in Lang Well once at 2 MPN/100 mL on March 18, 2003, during a rain event. The highest total coliform concentration of 24,000 MPN/100 mL in the creek was also detected during the same rain event on March 19, 2003, after four days of continuous rain. *Giardia* and *Cryptosporidium* have not been detected in the wells during the study periods. *Giardia* and *Cryptosporidium* concentrations in the creek ranged from <0.02 Org/L to 0.03 Org/L and <0.2 Org/L to 0.4 Org/L, respectively (Appendix 5).

The study fell short to demonstrate that natural filtration could provide at least 99 percent (2-log) reduction in *Giardia* cysts, 90 percent (1-log) reduction in *virus*, and 99 percent (2-log) reduction in *Cryptosporidium* to be qualified as an alternative technology. In addition, due to the limited turbidity and fecal/total coliform density sampling frequency and the short sampling durations, the study did not generate sufficient data to demonstrate the wells could meet the criteria for avoiding filtration.

On January 11, 2007, the District submitted to the Department a complete SDWSRF application (Attachment 6) to construct a water treatment plant for the Rose Well and Lang Well. The application is currently under review by the Department.

In an effort to minimize the risks of microbiological contamination from the creek water, the District currently operates Rose Well and Lang Well in accordance with the Rose and Lang Wells Interim Operational Protocol (Attachment 7). The Interim

Operational Protocol provides protection from microbiological contamination by chlorination and by equipping the wells with automatic shutdown features.

Based on historical well water quality data and the effectiveness of natural filtration, it is reasonable to assume that the main pathogen of concern for water produced from the wells is virus. Rose Well discharges to an 8-inch pipeline. The first service connection is approximately 430 feet away from the well. Lang Well discharges to a 14-inch pipeline and the first customer is located 650 feet from the well. Since the Rose Well discharge pipeline provides a shorter contact time, we checked the levels of microorganism inactivation provided for the Rose Well. The 430 feet of 8-inch pipeline provides approximately 1,120 gallons of contact volume. In the worst case condition whereas Rose Well is operating at its peak capacity of 530 gpm, this pipeline provides a contact time of 2.1 minutes. The Interim Operational Protocol calls for a target chlorine residual of 1.8 mg/L. The District's chlorine residual data indicates that chlorine residual drops approximately 0.1 mg/L at the first sampling station, which is located 1,500 away from the well. By interpolation the residual drop at the first service connection, 430 feet from the well, is estimated to be 0.03 mg/L. The estimated chlorine residual at the first service connection is, therefore, 1.77 mg/L which corresponds to a CT value of 3.72 mg/L-min. Lowest recorded well water temperature is 17 degrees Celsius (62.6 degrees Fahrenheit), with an associated pH of 7. The required CT value for 4-log virus inactivation at this temperature and pH is approximately 3.6 mg/L-min. The required CT value for 0.5-log *Giardia* inactivation at 1.77 mg/L chlorine concentration with the same temperature and pH is approximately 12.4 mg/L-min. Chlorination practice as prescribed by the Interim Operational Protocol, therefore, could provide 4-log virus inactivation and less than 0.5-log *Giardia* inactivation.

The Interim Operational Protocol requires the District to continuously monitor the wells effluent for turbidity and chlorine residual using on-line turbidimeters and chlorine analyzers. When turbidity of the well water exceeds 0.3 NTU or chlorine residual is lower than 1.8 mg/L, the well pumps are shutdown automatically. At the same time, alarm signals are sent to the District's SCADA central monitoring station and to the laptop computer of the standby operator. The District currently monitors Rose Well and Lang Well for *Cryptosporidium*, E. *coli*, and turbidity in accordance with the LT2ESWTR Monitoring Plan approved by the Department on October 2, 2006.

While the Rose Well and Lang Well water quality meet all other drinking water standards and the recent study shows that the natural filtration does remove pathogens, the District has failed to collect sufficient data to demonstrate these wells meet the filtration avoidance criteria as provided in the California SWTR. Despite many attempts to seek funding, the District's plan to construct a water treatment plant for Rose Well and Lang Well has not yet materialized. The District does not provide any multibarrier treatment that meets the requirements of the California SWTR. The only treatment provided at the Rose Well and Lang Well is natural filtration with non-quantified level of pathogen removal and chlorination using sodium hypochlorite with 4-log of virus and less than 0.5-log of Giardia inactivation.

CONCLUSION OF LAW

Based upon the above-described Findings of Fact, the Department finds that the District has violated CCR, Title 22, Chapter 17, Section 64650 (b). Specifically, the District has failed to provide multibarrier treatment necessary to reliably protect users from the adverse health effects of microbiological contaminants and to comply with the requirements and performance standards prescribed in Chapter 17.

ORDER

Pursuant to Section 116655 of the California Health and Safety Code, the Department hereby orders the Respondents, Trabuco Canyon Water District, to do the following to ensure that the water supplied to consumers is at all times pure, wholesome, healthful, and potable:

1. Cease-and-desist from failing to comply with the CCR, Title 22, Chapter 17, Section 64650 (b) by **March 30, 2010**. The District shall provide multibarrier treatment that meets the requirements of the California SWTR and the federal IESWTR for the water pumped from the Rose Well and Lang Well. Specifically, the multibarrier treatment shall reliably ensure through filtration and disinfection at least a total of 99.9 percent and 99.99 percent reduction of *Giardia* cysts and viruses, respectively, and through filtration at least 99.0 percent removal of *Cryptosporidium.*

2. Submit a compliance plan to the Department for review and approval by **November 30, 2007**. The plan shall describe how the District will achieve full compliance with this Order under two scenarios: 1) construction a water treatment plant for the Rose Well and Lang Well with a loan from the State Revolving Fund Program, 2) construction of the treatment plant with funding from other resources. The plan shall also provide a compliance schedule that meets the deadline set by this Order in each scenario.

3. Continue to follow and implement the Rose and Lang Wells Operational Protocol as an interim measure. The District shall conduct chlorine residual monitoring at the first connections that receives water from the Rose and Lang Wells. In addition, the District shall prepare and submit to the Department turbidity monitoring results and disinfection process data reports for the Rose Well and Lang Well by **the 10th day of each month**.

4. Submit a written progress report on the status of completion of the needed improvements to the Department **every three months after the date of the Department's approval of the time schedule.**

5. Notify the public of the SWTR treatment technique violation within 30 days of receiving this order by 1) mail or direct delivery to each customer receiving a bill including those that provide their drinking water to others (e.g., schools or school systems, apartment building owners, or large private employers), and other service connections to which water is delivered by the water system; and 2) use of one or more of the following methods to reach persons not likely to be reached by a mailing or direct delivery (renter, university students,

nursing home patients, prison inmates, etc.): (a) publication in a local newspaper; (b) posting in conspicuous public places served by the water system, or on the Internet; or (c) delivery to community organizations. A template for conducting this notification is provided as Attachment 8. The notification shall be approved by the Department prior to dissemination. Attachment 9 is to be used to advise the Department upon completion of the notification. This notification shall be **repeated every three months** as long as the violation continues.

The Department reserves the right to make such modifications to this Order as it may deem necessary to protect public health and safety. Such modifications may be issued as amendments to this Order and shall be effective upon issuance. All submittals required by this Order shall be addressed to:

Shu-Fang Orr, P.E.
District Engineer, Santa Ana District
Drinking Water Field Operations Branch
Department of Health Services
28 Civic Center Plaza, Room 325
Santa Ana, CA 92701

If Respondents are unable to perform the tasks specified in this Order for any reason, whether within or beyond Respondents' control, and if Respondents notify the Department in writing no less than seven days in advance of the due date, the Department may extend the time for performance if Respondents demonstrate that they have made their best efforts to comply with the schedules and other

requirements of this Order. If Respondents fail to perform any of the tasks specified in this Order by the time described herein or by the time as subsequently extended pursuant to this paragraph, Respondents shall be deemed to have failed to comply with the obligations of this Order and may be subject to additional judicial action, including civil penalties as specified in the Health and Safety Code, Section 116725.

The State of California shall not be liable for any injuries or damages to persons or property resulting from acts or omissions by Respondents, its employees, agents, or contractors in carrying out activities pursuant to this Order, nor shall the State of California be held as a party to any contract entered into by Respondents or its agents in carrying out activities pursuant to this Order. By issuance of this Order, the Department does not waive any further enforcement actions.

PARTIES BOUND

This Order shall apply to and be binding upon Respondents, its officers, directors, agents, employees, contractors, successors, and assignees.

SEVERABILITY

The requirements of this Order are severable, and Respondents shall comply with each and every provision thereof notwithstanding the effectiveness of any provision.

July 23, 2007

Date

Heather Collins
Regional Engineer,
Drinking Water Field Operations Branch

Attachments (9):

1. The Department's letter dated February 9, 1996
2. SRF Project No. 3010094-001 – Technical Project Report
3. DWR's Project By-Pass letter dated May 20, 2004
4. The District's letter dated May 20, 2005
5. Rose Well and Lang Well water quality data as provided in the HDR's 2006 Draft Engineering Report
6. The District's SDWSRF Application cover letter dated January 11, 2007
7. Rose Well and Lang Well Interim Operational Protocol
8. Tier 2 Public Notification Template
9. Proof of Public Notification

cc: Orange County Environmental Health